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Original Article

In vitro evaluation of antifungal activity of leaf extract of *Adathoda Vasica*

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ABSTRACT

In the present study, antifungal activity of *Adathoda vasica* was evaluated on six different fungal species by employing various concentrations of leaf extract (0.5-2.0mg). All the concentrations of leaf extract inhibited the fungal growth and maximum activity was observed at 2.0 mg concentration. Among different doses, the diameter of inhibition zone ranged from 0.5 to 1.6 cm in various fungal species and increased with the increase in the concentration of test solution. Among all the fungi, high inhibition zone were observed in *Fusarium* oxysporium (1.6cm) followed by *Fusarium monilifarmae* (1.5cm), *Colletotrichum capsici* (1.4cm) *and Rhizoctinia* (1.2cm). *Alternaria* (1.0cm) and *Macrofomina* (0.8cm) exhibited lower activity compared to other organisms.

Key Words: Antifungal activity, Agar bio-assay, zone of inhibition

INTRODUCTION

Medicinal plants are widely utilized in different countries of the world, and it has been reported that up to 25% of the drugs prescribed in conventional medicines are directly or indirectly prepared from plants and their products. These plants produce a variety of compounds of known therapeutic properties such antibacterial, antiprotozoal, astringent, tonic, vasomotor and circulatory stimulant [1]. Antimicrobial properties of plant extracts are being increasingly reported from different parts of the world. The leaf extract of some of the important plants like *Lawsonia inermis*, *Achyranthes aspera*, *Mimosa pudica* are known to have antimicrobial activity [2, 3]. *Adathoda vasica (*Family – Acanthaceae) is one of the important plant commonly used in traditional medicine to cure bronchitis. It is also used in Ayurvedic medicines to treat respiratory disorders [4]. In the present study the antifungal activity of petroleum ether extract of *Adathoda vasica* was tested against six different fungal pathogens namely *Fusarium oxysporium, Colletotrichum capsici* , *Rhizoctinia* , *Alternaria* , *Fusarium moniliformi* and *Macrofomina* using agar cup Bioassay.

MATERIALS AND METHODS

Collection of plant material: Fresh leaves of *Adathoda vasica* were collected from Botanical garden, Osmania University College for women, koti, Hyderabad. The leaves were washed thoroughly with tap water and dried under shade. Air –dried, plant material was powdered and extracted with petroleum ether

Preparation of plant extract: Finely powdered leaves (20gm) were extracted with 300 ml of petroleum ether (60-80^{o}C) using soxhlet apparatus. The plant extract was further concentrated in rota vapour and residues were weighed. Different concentrations of stock solutions (0.5 mg to 2.0mg) were prepared by dissolving the plant extract in DMSO (Dimethyle sulphoxide).

Maintenance of test fungi: Fungal cultures of *Fusarium oxysporium, Colletotrichum capsici, Rhizoctinia, Alternaria, Fusarium moniliformi* and *Macrofomina* were obtained from the institute of Microbial Technology, Chandigarh. All the test cultures were maintained on Potato Dextrose Agar (PDA) media with regular sub-culturing.

Bioassay: Agar cup bioassay [5] was employed for testing antifungal activity of plant extract. The ready-made PDA medium (Himedia,39g) was suspended in distilled water and autoclaved at pressure of 15lb/inc^{2} for 20min. Seven days old cultures of test organisms (0.5ml) were inoculated onto the medium. After inoculation, cups were scooped out from Petri plates with 8mm sterile

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cork borer. To each cup, different concentrations of test solutions (0.5mg to 2.0mg) were added. Controls were maintained with DMSO only. The treated and the controls were kept in an incubator at 26^0 C for 24h to 78h and inhibition zones were measured. Three to four replicates were maintained for each treatment.

RESULTS

Antifungal activity of *Adathoda vasica* was evaluated against six different fungal species by employing various concentration of leaf extract (0.5-2.0mg). All the concentrations of leaf extract inhibited the fungal growth. Maximum activity was observed at 2.0 mg concentration of extract. With different concentrations of extract tested, the inhibition zone varied from 0.5 to 1.6 cm and increased with the increase in the concentration of test solution (Table.1). Among all the fungi, high inhibition zone were observed in *Fusarium* oxysporium (1.6cm), followed by *Fusarium monilifarmae* (1.5cm), *Colletotrichum capsici* (1.4cm) *and Rhizoctinia* (1.2cm). *Alternaria* and *Macrofomina* exhibited slightly lesser activity compared to other organisms i.e *1.0* cm and 0.8cm respectively (Fig.1 & 2).

DISCUSSION

The present study clearly showed that the leaf extract of *Adathoda vasica* possess antifungal activity against six different fungi tested, *Fusarium* oxysporium (1.6cm), followed by *Fusarium monilifarmae* (1.5cm), *Colletotrichum capsici* (1.4cm) *and Rhizoctinia* (1.2cm). *Alternaria* and *Macrofomina* (0.8cm). Similarly leaf extract of *Adhatoda vasica* showed 100% inhibition against *F. oxysporuim*. [6] There are several other reports on screening of leaf extracts of different plants against various fungal pathogens by many scientists [7][8]. Similar to the present study leaf extract of *Butea monosperma*, *Tylophora indica* was reported to have antifungal property against *Fusarium oxysporium* [9] [10] and *Vitex negundo* was found active against *Colletotrichum* [11].

CONCLUSION

The present study has shown that the leaf extract of *Adathoda vasica* has potent antifungal property against six different fungal species indicating its broad spectrum antifungal activity. Thus leaf extract of this plant can be exploited for the development of plant based fungicides.

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Table1: Antifungal activity of leaf extract of *Adthoda vasica* against six different fungal pathogens.

Test Fungi	Concentration of mg			
	0.5mg	1.0mg	1.5mg	2.0mg
	Zones of inhibition (cm)			
Fusarium oxysporium	0.5	0.7	1.0	1.6
Fusarium monolifarmae	0.3	0.5	0.7	1.5
Colletotrichum capsici	0.2	0.4	0.6	1.4
Rhizoctima	0.5	0.8	1.2	1.2
Alternaria solani	0.3	0.5	0.9	1.0
Macrophomina	0.2	0.5	0.7	0.8

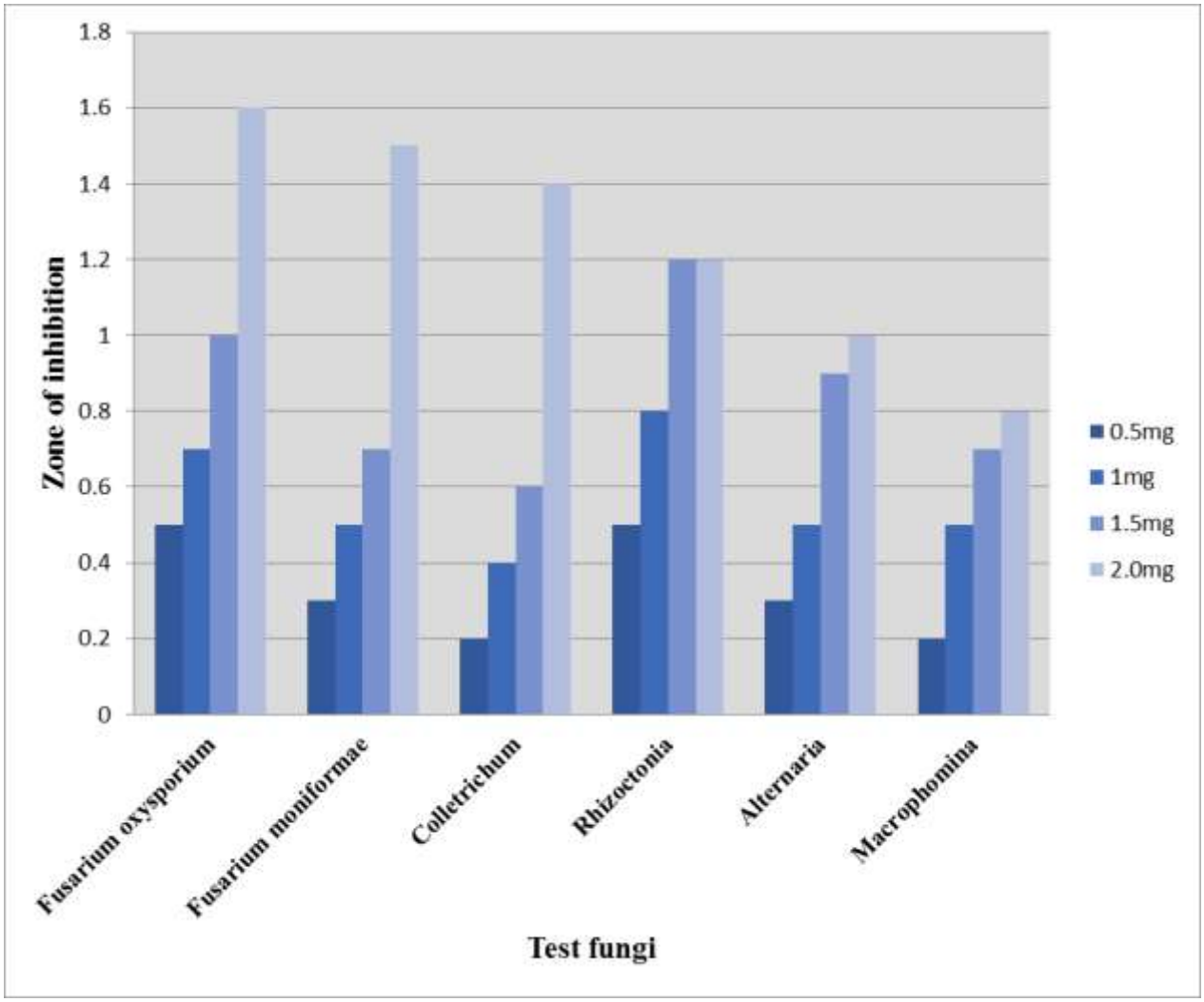

Fig1: Antifungal activity of leaf extract of *Adthoda vasica* against six different fungal pathogens.

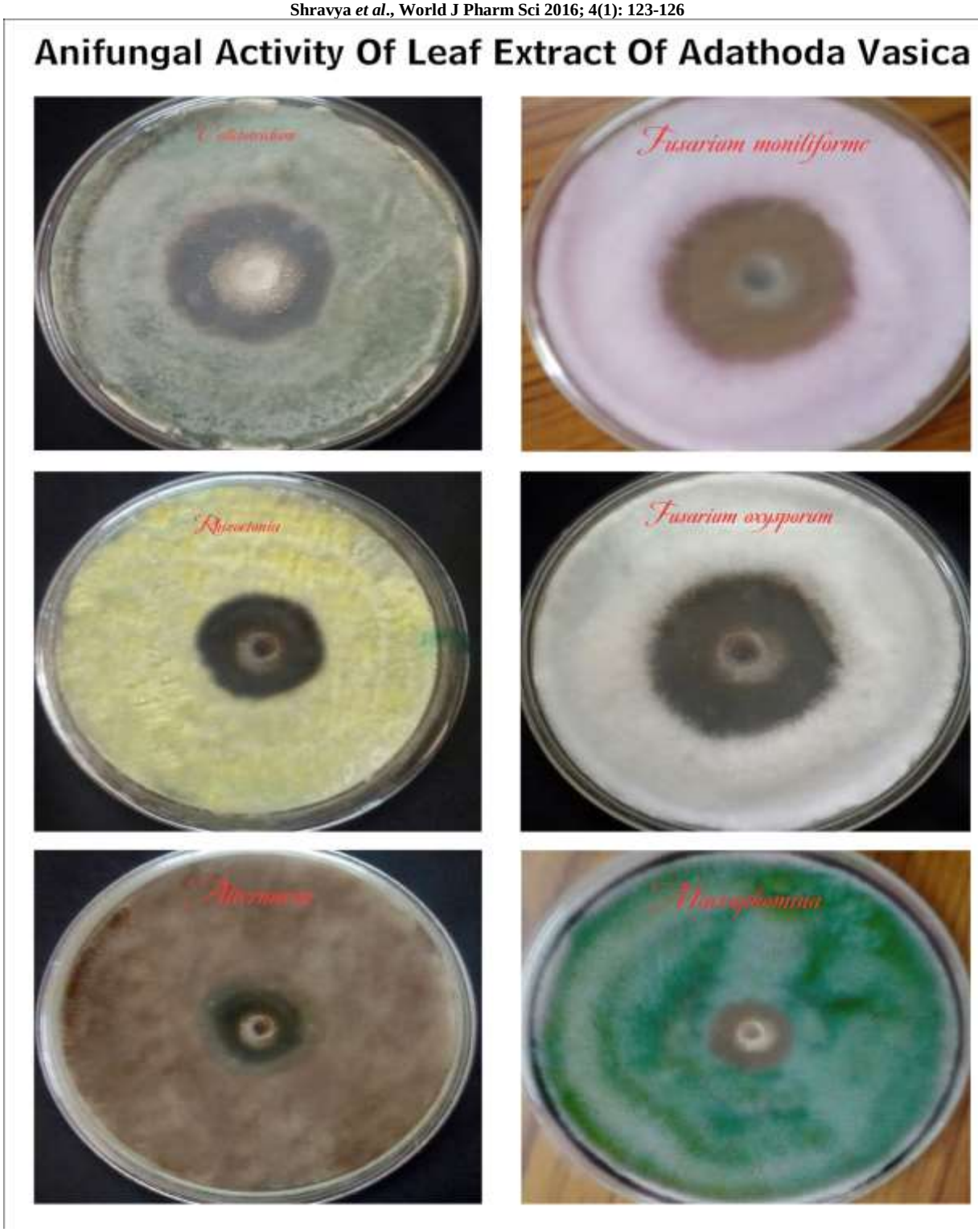

Fig 2 : Antifungal activity of leaf extract of *Adthoda vasica* against six different fungal pathogens.